

4-5 Study Guide and Intervention

Proving Triangles Congruent—ASA, AAS

ASA Postulate The Angle-Side-Angle (ASA) Postulate lets you show that two triangles are congruent.

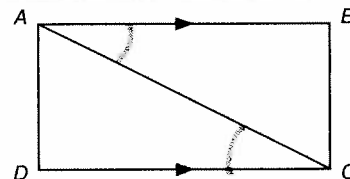
ASA Postulate	If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.
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Example Write a two column proof.

Given: $\overline{AB} \parallel \overline{CD}$

$\angle CBD \cong \angle ADB$

Prove: $\triangle ABD \cong \triangle CDB$



Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$	1. Given
2. $\angle CBD \cong \angle ADB$	2. Given
3. $\angle ABD \cong \angle BDC$	3. Alternate Interior Angles Theorem
4. $BD = BD$	4. Reflexive Property of congruence
5. $\triangle ABD \cong \triangle CDB$	5. ASA

Exercises

PROOF Write the specified type of proof.

1. Write a two column proof.



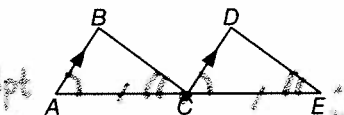
Given: $\angle S \cong \angle V$,

T is the midpoint of \overline{SV}

Prove: $\triangle RTS \cong \triangle UTV$

Statements	Reasons
1. $\angle S \cong \angle V$ ✓	1. Given
T is the midpoint of \overline{SV}	
2. $\overline{ST} \cong \overline{TV}$ ✓	2. def of midpt
3. $\angle RTV \cong \angle UTV$ ✓	3. Vertical \angle s are \cong
4. $\triangle RTS \cong \triangle UTV$	4. ASA

2. Write a paragraph proof.



Given: \overline{CD} bisects \overline{AE} , $\overline{AB} \parallel \overline{CD}$
 $\angle E \cong \angle BCA$

Prove: $\triangle ABC \cong \triangle CDE$

Statements	Reasons
1. \overline{CD} bisects \overline{AE} $\overline{AC} \cong \overline{CE}$ $\angle E \cong \angle BCA$	1. Given
2. $\overline{AC} \cong \overline{CE}$	2. def of seg. bisector
3. $\angle BAC \cong \angle DCE$	3. corresp. \angle s are \cong
4. $\triangle ABC \cong \triangle CDE$	4. ASA

4-5 Study Guide and Intervention (continued)**Proving Triangles Congruent—ASA, AAS**

AAS Theorem Another way to show that two triangles are congruent is the Angle-Angle-Side (AAS) Theorem.

AAS Theorem

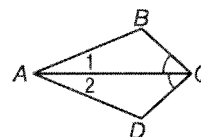
If two angles and a nonincluded side of one triangle are congruent to the corresponding two angles and side of a second triangle, then the two triangles are congruent.

You now have five ways to show that two triangles are congruent.

- definition of triangle congruence
- SSS Postulate
- SAS Postulate
- ASA Postulate
- AAS Theorem

Example

In the diagram, $\angle BCA \cong \angle DCA$. Which sides are congruent? Which additional pair of corresponding parts needs to be congruent for the triangles to be congruent by the AAS Theorem?



$\overline{AC} \cong \overline{AC}$ by the Reflexive Property of congruence. The congruent angles cannot be $\angle 1$ and $\angle 2$, because \overline{AC} would be the included side. If $\angle B \cong \angle D$, then $\triangle ABC \cong \triangle ADC$ by the AAS Theorem.

alt int
corresp

Exercises

PROOF Write the specified type of proof.

1. Write a two column proof.

Given: $\overline{BC} \parallel \overline{EF}$

$\overline{AB} \cong \overline{ED}$

$\angle C \cong \angle F$

Prove: $\triangle ABC \cong \triangle DEF$

Statements Reasons

1. $\overline{BC} \parallel \overline{EF}$

$\overline{AB} \cong \overline{ED}$

$\angle C \cong \angle F$

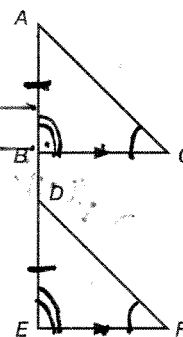
2. $\angle B \cong \angle E$

3. $\triangle ABC \cong \triangle DEF$

1. Given

2. corresp. \angle s are \cong

3. AAS \cong



Plan: AAS

2. Write a flow proof.

Given: $\angle S \cong \angle U$; \overline{TR} bisects $\angle STU$.

Prove: $\angle SRT \cong \angle URT$

